ABS ACTA BIOLOGICA SIBIRICA
A journal on the biodiversity of Siberia and the adjacent lands

Acta Biologica Sibirica 6: 59–86 (2020)
doi: 10.3897/abs.6.e53717
https://abs.pensoft.net

RESEARCH ARTICLE

An annotated checklist of the tribus Parnassiini sensu Korshunov of the Old World (Lepidoptera, Papilionidae)

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Academic editor: A. Matsyura | Received 17 April 2020 | Accepted 29 May 2020 | Published 23 July 2020

Citation: Stanislav K. Korb (2020) An annotated checklist of the tribus Parnassiini sensu Korshunov of the Old World (Lepidoptera, Papilionidae). Acta Biologica Sibirica 6: 59–86. https://doi.org/10.3897/abs.6.e53717

Abstract

It is the first checklist of Parnassiini of the Old World within last 25 years. The list comprises of 54 species and 6 genera. This list takes into account all modern data about the tribus, special attention paid to the molecular investigations. The type localities of 35 species have been corrected or qualified.

Keywords

Parnassiinae, Parnassian butterflies, Old World, annotated checklist.

Introduction

Butterflies of the tribus Parnassiini sensu Korshunov (genus Parnassius sensu Ackery) are one of the most popular (if not most popular) objects of research and collecting within Lepidoptera. There are lots of papers devoted to their systematics and nomenclature. The number of described subspecies and infrasubspecific forms is

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countless, it is a reason of huge amount of the synonyms and unjustified emendations as far as constantly juggling the ongoing statuses. In the last decades when the methods of DNA analysis, variative statistics and multivariative morphometric analysis started to be used widely, some of the taxonomic problems inside of this tribus were resolved (Gratton and Sbordoni 2005; Gratton et al. 2006, 2008; Korb 2011, 2012, 2013; Korb et al. 2016; Todisco et al. 2010, 2012). However, the system of this tribus in general remain the same ancient state. The problem within the systematics of this tribus is very simple: when other organisms researched by progressive methods in general, the "Parnassiologists" still keep the system of O. Staudinger (all taxa within this tribus are members of the same genus) using mainly wing pattern and refuse to use the benefits of the new techniques. This is very strange in that sense, that all phylogenetic papers clearly showing clusters within the tribus cladograms, which are in the very strong correlation to its morphological features (especially the male genitalia).

It is very important to note that within Parnassiinae no male genitalia variability have been found (Korb 2012). Thus, the genitalia structures within this group are the objects of great importance for the species determination as far as for the system building. The history of building of the system of this tribus is very rich, so I will just touch it here a little bit without the deep analysis which can be found in the last books published on this topic (Sorimachi 1995; Kocman 2009; Weiss 1991–2005; Rose and Weiss 2011; Weiss and Rigout 2016). The first system of Parnassiini prepared by Austaut (1889) and based on the structure of sphragis. The next system produced by Stichel (1906) and based on the wing venation; actually it was a replica of the Austaut's system but with using another morphological structures as the system basis. At the same time the systems, based on the male genitalia and wing pattern, appeared (Moore 1902; Sokolov 1929; Bryk 1935). Ackery (1975), an author of the widely used system of Parnassiini, used the term "group" like "*apollo*-group", "*delphius*-group" etc. Finally, the most radical reformation of the system of Parnassiini performed by Korshunov (1988, 1990): he erected 4 new genus group taxa, raised the status of the genus *Parnassius* sensu Ackery 1975 to the tribus and established the new subtribes Parnassiina, Koramiina and Sachaenina. Another great parnassiologist, Kreuzberg, used mostly the host plant preferences and trophic chemistry of Parnassiini for building his system; in his opinion, *Parnassius* sensu Ackery, 1975 is a monophyletic group and consists of 6 subgenera (Kreuzberg and Dyakonov 1990). The other systems proposed in the last century are in fact only reflections of the systems listed above, or their modifications (Ford 1944; Munroe 1961; Eisner 1974; Higgins 1975; Hiura 1980; Hancock 1983; Igarashi 1984; Koçak 1989). The last annotated list of Parnassiini published over 25 years ago by Häuser (1993).

The reviews of Parnassiini published recently (Sorimachi 1995; Sakai et al. 2002; Weiss 1991, 1992, 1999, 2005; Rose and Weiss 2011; Weiss and Rigout 2016), but these papers are good examples of the "parnassiologist" point of view on the

system of this group: the highest concentration on the subspecies and only few words about the generic (or subgeneric) structure of Parnassini. I must also mark the recently published book about the Parnassiini of Tibet (Kocman 2009), which is almost the same in the topic of subspecies composition.

Within last two decades I managed to find most of the type material of the species of this tribus; to find the type material belonging to all described species group taxa of this tribus (like subspecies or infrasubspecific forms) I see as a mission impossible: there are thousands and thousands of them, partially deposited in the private collections, partially lost or stolen, etc. This is easily illustrated on examples of several species of Parnassiini, which have been recently revised: *Parnassius apollo* (Linnaeus, 1758) (Glaßl 2017a) with 296 valid (!!!) subspecies and over 600 aberrations or *Driopa mnemosyne* (Linnaeus, 1758) (Glaßl 2017b) with 175 valid (!!!) ones.

I do not want to discuss the status of generic names within Parnassiini; genera or subgenera – depend from the researcher point of view. In the last part of the book "The Parnassiinae of the World" (Weiss and Rigout 2016) these taxa treated as subgenera with species complexes inside. In my opinion these taxa represent good genera because they form very strong clusters in the phylogenetic tree; they are representing the separate genera because they have very deep and strong differences in the male genitalia; and they are representing the distinct genera because they have very strict host plant associations. Clear advantage to use generic ranks instead of subgeneric is that no need to adopt non-systematic categories like "groups", "complexes" etc. – easy to use subgenera. The similarity in the external morphology is widely distributed and proved biological fact, and it is the only thing which supports the followers of the "monolithic Parnassius", it is very weak evidence and it must be supported by many other features; but facts are opposite.

Actually these genera can be subgenera too, this is not so much important. The main thing that we must recognize in the system is to use the correct taxa ranks but not the surrogates like "species group"; I think, it's time to adopt modern, reasonable and scientific system of this tribus. This paper is about to make it.

I must also pay attention to the highest commercial interest within this group (Rose 1995; Korb et al. 2016). This is the reason that a huge number of species group taxa is described inside this group; this is the reason that the statuses of some of the described taxa are constantly changing; this is the reason that from time to time descriptions of fake species appear. In the last quarter of century the fake species are: *choui* Huang et Shi, 1994, *liudongi* Huang, 1999, *cheungensis* Zhang, 2010. Sometimes fake species descriptions (as far as some subspecies with very weak or invisible diagnostic features) appear in the sources very hard to obtain; for example, the description of *cheungensis* Zhang, 2010 remained unknown until current time, this taxon known only by several pictures from the online sale resources (like eBay).

Material and methods

Materials of this paper are collected by the author and A.A.Shaposhnikov (Podolsk, Russia), P.A. Egorov (Almaty, Kazakhstan), D.A. Pozhogin and Y.B. Kosarev (Nizhny Novgorod, Russia) in various parts of Russia, Kazakhstan, Kyrgyzstan and Tajikistan. The type specimens have been studied in the following institutions: Zoological Institute of the Russian Academy of Sciences (St-Petersburg, Russia), Zoological Museum of the Moscow University (Moscow, Russia), Finnish Natural History Museum (Helsinki, Finland), Museum für Naturkunde Leibniz-Institut für Evolutions- und Biodiversitätsforschung (Berlin, Germany), Zoologisches Staatssamlung (München, Germany), British Museum (London, UK).

The male genitalia dissection was performed by the unified method of Stradomsky (2005).

A key to determine genera (subgenera) within Parnassiini sensu Korshunov, 1990

1(2) Fertilized female with no sphragis; aedeagus curved to almost 90 degrees (fig. 5) ..... ***Kreizbergius***

2(1) Fertilized female with sphragis; aedeagus always straight or almost straight (figs 1 – 4, 6, 7).

3(4) Male genitalia with subscaphium (fig. 2)..... ***Sachaia***

4(3) Male genitalia without subscaphium

5(8) The vein M1 emerged from the veins R4 and R5 and widely anastomosing with them; harpa is a wide dorsal lobe (fig. 7).

6(7) Wing pattern without red spots in both sides..... ***Driopa* s. str.**

7(6) Wing pattern with red spots at least in the underside ..... ***Erythrodriopa***

8(5) The vein M1 emerged from the veins R4 and R5 and not anastomosing with them; harpa is a process.

9(12) Uncus motile.

10(11) Uncus not massive, bilobed, cylindrical with pointed apex; aedeagus thick with big enlargement in its basal part (fig. 6) ..... ***Parnassius* s. str.**

11(10) Uncus massive sikle-shaped and well-sclerotized; aedeagus thin... ***Tadumia***

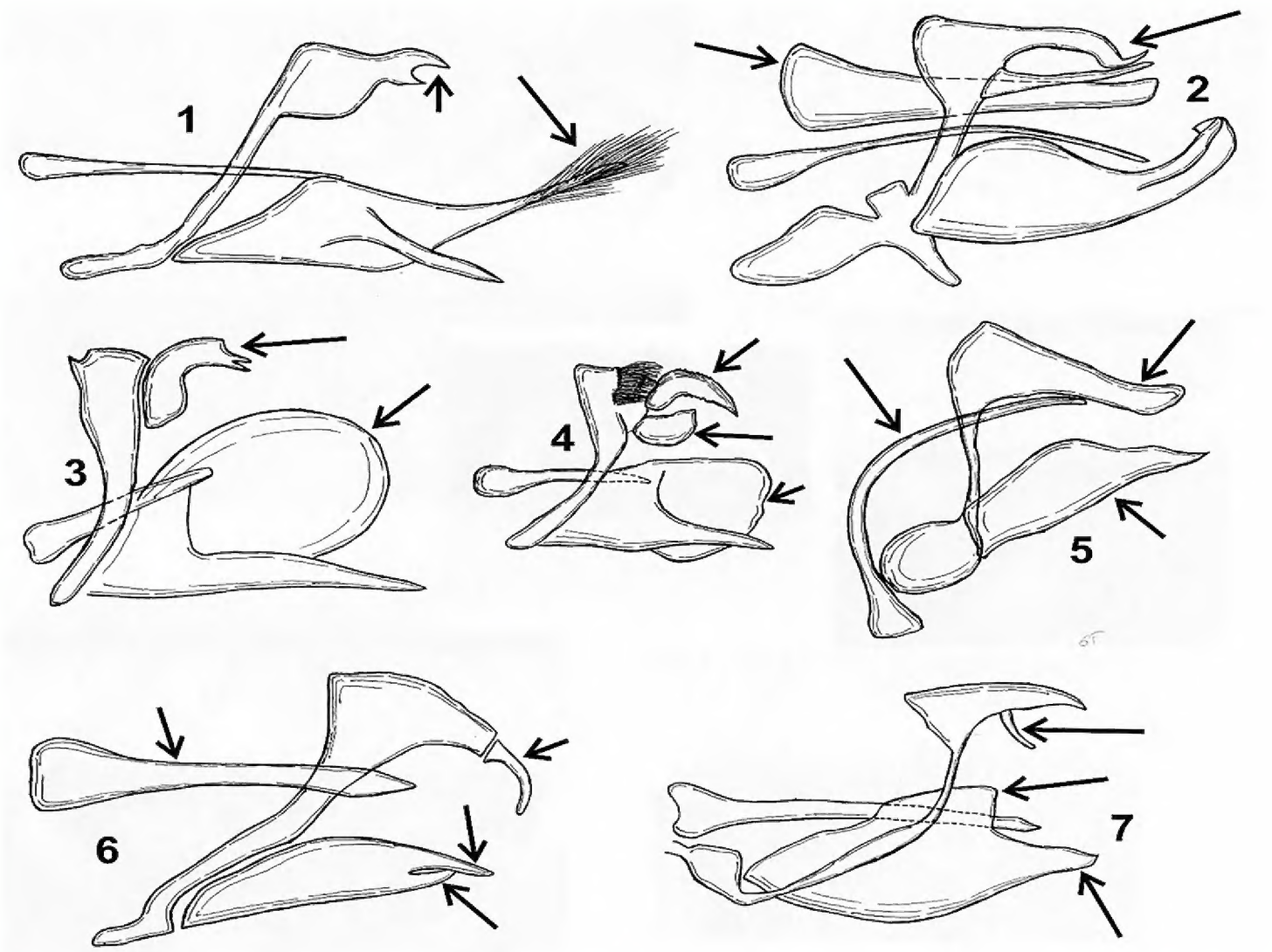
12(9) Uncus immotile.

13(14) Uncus bidentate; caudal process of the valva shorter than half of valva ..... ***Kailasius***

14 (13) Uncus monodentate; caudal process of the valva longer than half of valva.. .....***Koramius***

Abbreviations used

TS – type species
TL – type locality



Figures 1–7. Male genitalia of Parnassiini, schematic. **1** *Koramius imperator* (Oberthür, 1883), China, Nan-Shan. **2** *Sachaia tenedius* (Eversmann, 1851), Russia, Buratia. **3** *Tadumia szechenyii* (Frivaldsky, 1886), China, Qinghai Prov. **4** *T. hardwickii* (Gray, 1831), China, Kashmir. **5** *Kreizbergius simonius* (Staudinger, 1889), Kyrgyzstan, Alai. **6** *Parnassius bremeri* Bremer, 1864, Russia, Radde. **7** *Driopa nordmanni* (Ménétriès, [1850]), Russia, Caucasus.

An annotated list of species

Genus *Driopa* Korshunov, 1988. TS: *Papilio mnemosyne* Linnaeus, 1758 (original designation).

Subgenus *Driopa* s.str.

Driopa (s. str.) *mnemosyne* (Linnaeus, 1758)

TL. "in Finlandia" ["Åland island" after correction, see below]. The lectotype (Honey and Scoble 2001: 351) have no locality label.

Correction. Its type locality ("in Finlandia") must be corrected to the Åland island, which was visited by the Lappland expedition of Linnaeus in June 1732 (Linnaeus 1737); other places in Finland where this species occurs visited by him after its flying time (July – September 1732). No more trips to Finland were performed by Linnaeus (Bobrov 1970).

Distribution. Europe (northwards to Middle Finland and South Norway), Caucasus, Transcaucasus, Asia Minor, Forward Asia, western limits of West Siberia (Tyumen Prov.), Central Asia, Kopet-Dagh.

Driopa (s. str.) *stubbendorfii* (Ménétriès, 1849)

TL. "Kansk" (by the lectotype designation) (Nekrutenko and Kerzhner 1986: 776) ["Kansk environs near Khorma river" after clarification in accordance with Recommendation 76A.1.2 of the Code].

Clarification. Ménétriès (1846) noted that the material collected by Stubbendorf in the Kansk vicinity was collected near the Khorma river; thus this locality must be stated as its type locality according the Recommendation 76A.1.2 of the Code: "Kansk environs near Khorma river".

Remark. In the book of Weiss and Rigout (2016) the taxa *hoenei* Schweitzer, 1912, *esakii* Nakahara, 1926 and *tateyamai* Fujioka, 1997 listed as 'semispecies' of *D. stubbendorfii*. Molecular data does not support this opinion (Yagi et al. 2001; Wang et al. 2019); these taxa are good island subspecies but not 'semispecies' or any other status making it closer to species than to subspecies. The wing pattern differences are very weak and unclear, the male genitalia were not figured by Weiss and Rigout (2016) and no male genitalia differences were listed. This is quite understandable: there are not any differences.

Distribution. South Siberian mountains (in the borders of Russia, China and Mongolia), Novosibirsk and Kemerovo Provinces in the West Siberian Plain, Far East (northwards to Magadan Prov., southwards to South Korea), Southern Kuril Islands, Sakhalin (Asahi et al. 1999), Japan.

Driopa (s.str) *glacialis* (Butler, 1866)

=*D.* (s.str.) *citrinarius* (Motschulsky, 1866)

TL. "in Hakodadi (North Japan)" (by the lectotype designation) (Korb 2017a: 6).

Qualification. Hakodadi is a Japanese harbor located near southern limit of Yesso island.

Distribution. Russia: Vladivostok Prov., Sakhalin island; North Korea; North-East and partially Central China; Japan: southern part of Hokkaido island, northern part of Honshu island.

Subgenus *Erythrodriopa* Korshunov, 1988. TS: *Parnassius ariadne* Kindermann in Lederer, 1853 (original designation).

Driopa (*Erythrodriopa*) *nordmanni* ([Ménétriès], [1850])

TL. "Monti / Adschara" (by the lectotype designation) (Nekrutenko and Kerzhner 1986: 776) ["Adzhara Mt. located 43.540833 N, 40.688611 E" after qualification].

Qualification. Adzhara Mt. (2907 m, coordinates: 43.540833 N, 40.688611 E) is on the territory of the Caucasian Nature Reserve, Russia.

Distribution. Caucasus.

Driopa (*Erythrodriopa*) *phoebus* (Fabricius, 1793)

=*D.* (*E.*) *ariadne* (Lederer, 1793)
=*D.* (*E.*) *clarius* (Eversmann, 1843)

TL. "à l'est (entre 10 et 30 km) d'Oust'-Kaměnogorsk (Kazakhstan)" (by the neotype designation) (Hanus and Theye 2013: 342, fig. 5).

Remark. The situation with the name *Papilio phoebus* Fabricius, 1793 was resolved by Hanus and Theye (2010, 2013) (see *Parnassius corybas*). There are two Cases submitted to the International Commission of the Zoological Nomenclature (ICZN): one already rejected (Balletto and Bonelli 2014), to conserve of the accustomed usage of *Papilio phoebus* De Prunner, 1798 by suppression of *Papilio phoebus* Fabricius, 1793 (Opinion 2382); and one active (Lukhtanov et al. 2019) on the proposed conservation of prevailing usage of the specific name *Papilio phoebus* Fabricius, 1793 and that of *Doritis ariadne* Lederer, 1853 (currently *Parnassius ariadne*) by the designation of a neotype. As the previous Case was rejected, the nomenclature of this species is still under the strict usage of the Code, implemented by Hanus and Theye (2010, 2013). I think, it is already too late to try to conserve the name *Papilio phoebus* in its old sense. First of all, it is already widely used by entomologists who use the Code, unlike those who are rooted into the stone age of the systematics. Secondly, in time required for the ICZN decision, its usage will significantly increase. Finally, it is not known, what the Commission will decide, but the system we are using right now.

Distribution. Tarbagatai, Saur, Altai.

Driopa (*Erythrodriopa*) *eversmanni* ([Ménétriès], [1850])

TL. "Kansk" (by the holotype) (Nekrutenko and Kerzhner 1986: 774) ["Kansk environs near Khorma river" after clarification in accordance with Recommendation 76A.1.2 of the Code].

Note 1. Ménétriès (1846) noted that Stubbendorf collected his material in the Kansk vicinity near the Khorma river; thus the type locality according the Recommendation 76A.1.2 of the Code is "Kansk environs near Khorma river".

Note 2. The taxon *felderi* Bremer, 1861, described from "Ching.[an]" (by the lectotype designation) (Korb and Bolshakov 2016: 41) is a subspecies of *D.* (*E.*) *eversmanni*. It has no differences in the male genitalia, and its COI sequences are identical to the one received from Altai, and have only one nucleotide difference from the sequence received from Alaska (the following sequences have been compared: *felderi* – AM231430, EF473797; *eversmanni* – KU875779 (Alaska), FJ663893 (Altai); all are openly accessible via GenBank)). The wing pattern and ground color features of this

taxon were statistically processed by Glustshenko and Martynenko (1998), the features of the wings of this taxon and 'pure' *eversmanni* showing up the clinal variability and it is clearly visible on the results of the cited authors. Basing on it as far as on that fact that these taxa (*felderi* and *eversmanni*) have no COI differences, the taxon *felderi* is only a variable subspecies of highly variable *eversmanni* (Korb and Bolshakov 2016).

Distribution. Mountainous areas of Siberia and Far East (westwards to the western borders of Altai, eastwards to Chukotka) in the borders of Russia, China, Mongolia and North Korea; Alaska in North America.

Driopa (*Erythrodriopa*) *orleans* (Oberthür, 1890)

TL. "Chine" ["Sichuan Prov. of China near Gardze city in the south-eastern Tibet" after correction].

Correction. Oberthür (1891: 6) noted that this species collected between the mountain pass Litang and locality Ta-Tsien-Lu ("entre Litang et Ta-Tsien-Loû"); this place is located near Gardze city in the south-eastern Tibet (Sichuan Prov. of China). Thus the corrected type locality of this species must be stated as: "Sichuan Prov. of China near Gardze city in the south-eastern Tibet".

Distribution. China: Eastern Tibet, South Shaanxi; North Burma.

Genus *Parnassius* Latreille, 1804. TS: *Papilio apollo* Linnaeus, 1758 (by monotypy).

Parnassius apollonius (Eversmann, 1847)

TL. "in Songariae montibus" (original description); "Songarie" (by the lectotype designation) (Korb 2017a: 6) ["foothills of Dzhungarian Alatau near Lepsinsk in South-Eastern Kazakhstan" by the correction].

Correction. Until current time the only information about the type locality of this taxon is that it was collected by Schrenk in Dzhungarian Alatau (Kreuzberg 1985). The exact type locality remained unknown. Schrenk visited this area four times (1840, 1841, 1842 and 1843). In all of these trips he can collect this species, so we must analyze every trip. We know the month of collecting: June ("Volat… Junio" (Eversmann 1847: 72)). In order to determine the exact type locality of this species we must recover Schrenk's journeys to Dzhungarian mountains in June. *1840*: His expedition started to work in 11th May in the environs of Semipalatinsk, and from June to August he was working in the lakes Balkhash, Alakol and Sasyk and in the Tarbagatai mountains (Schrenk 1845); so in this trip he was unable to collect this species. *1841*: This trip was started at 10th May again from Semipalatinsk, and then to Tarbagatai as in the previous trip; his way back started in July on the southern slope of Dzhungarian mountains (he visited the mountain gorge Tekeli) (Schrenk 1841); thus, this expedition was also not in time to collect *P. apollonius*. *1842*: This year the Schrenk's expedition started in May in the vicinities of Omsk, then it was moved to Petropavlovsk and in the beginning of June he was visited the Ulutau mountain (48.644173 N, 66.946388 E) in

Central Kazakhstan; then on the rivers Sary-su and Chu via Golodnaya Step' to Karkaraly and then back to Omsk (Maslova 1955); thus, in 1842 this species was also not collected because Dzhungarian mountains have not been visited. *1843*: It was the last trip of Schrenk in this area and it was started much earlier than three previous ones, in April. Its route was: Omsk – western shore of Balkhash lake – Khan-Tau Mts. – Ili river – Lepsa – Ayaguz – Semipalatinsk; Lepsa visited in June (Bogdanov 1875; Maslova 1955). Lepsa (now Lepsinsk in South-Eastern Kazakhstan, 45.534006 N, 80.613235 E) located in the foothills of Dzhungarian Alatau Mts. and according the route and timing of Schrenk's expedition it is definitely only place where Schrenk was able to collect *P. apollonius*. Thus, I correct the type locality of this species: foothills of Dzhungarian Alatau near Lepsinsk in South-Eastern Kazakhstan.

Distribution. Mountains of Central Asia and South-Eastern Kazakhstan, South-East Altai (within the borders of Kazakhstan), South Kazakhstanian lowlands (local), rocky shores of the rivers Ili and Charyn (including Chinese parts).

Parnassius honrathi Staudinger, 1882

TL. "etwa 2000–2500 Meter hoch, auf dem Hazret Sultan-Gebirge, südlich von Samarkand" (original description) ["Prov. Samarkand" by the lectotype designation (Korb 2017a: 6)].

Qualification. Hazreth-Sultan is a mountain in Gissar Mts. (4643 m; coordinates: 38.948333 N, 68.172222 E).

Distribution. Pamir-Alai, Gissaro-Darvaz, East Badakhshan.

Parnassius bremeri Bremer, 1864

TL. "Amur Ufer" (by the lectotype designation) (Korb 2016: 79) ["Oldoi river shores on its connection to Amur river" after correction].

Correction. In the original description the following information on its type locality is stated: "an der Mündung des Oldoi, an der Dseja und im Bureja-Gebirge; …am Ussuri, von seiner Mündung bis zur Ema" (Bremer 1864: 6). Thus the only Oldoi river coast which is connected to Amur river can be the shores of Amur as it is stated on the lectotype label. According to these data the type locality of *P. bremeri* must be corrected to «Oldoi river shores on its connection to Amur river» (53.554722 N, 123.329444 E).

Distribution. Transbaikal, Amur Prov., Ussuri Prov., North-East China, North Mongolia ("probably in the northern part of Hentiyn Nuruu" (Tshikolovets et al. 2009: 51), North Korea, Sakhalin island, Hokkaido island.

Parnassius corybas Fischer de Waldheim, 1824

TL. "Russia, Kamchatka, environs of the settlement Esso, 55°552503 N, 158°412413 E" (by the neotype designation) (Korb 2018a: 204).

Remark 1. This taxon was known earlier as *Parnassius phoebus* (Fabricius, 1793), but Hanus and Theye (2010, 2013) proved that it is a misidentified species,

and the name *phoebus* belong to the species known before as *P. ariadne* (Eversmann, 1853) (see *Driopa phoebus*).

Remark 2. The status of taxon *sacerdos* Vorbrodt, 1912 which by some authors was treated as a separate species (Häuser 1993) according to modern phylogeographic studies is a subspecies of *P. corybas* (Todisco et al. 2012).

Distribution. European mountains, Urals, mountains of Siberia and Far East. Its record from Transcaucasus (Nekrutenko 1990: 56) based on two old specimens (collected in 1836 and labelled "Adshara") is most likely erroneous.

Parnassius rueckbeili Deckert, 1909

TL. "montagnes des environs de la ville de Barkul, à l'extrémité de la chaîne des Mts du Ciel, long. 91°, lat. 43°, ö, au N.-E. du Lob-Noor" (original description).

Remark. The status of this taxon was raised by Michel et al. (2008) basing on a single COI sequence. It was confirmed by Todisco et al. (2012), but also basing on the single COI sequence. The lectotype of this taxon was designated by me (Korb 2017a: 6), it combines features of both *P. corybas* and *P. actius* (Eversmann, 1843).

Distribution. Known only from the type locality.

Parnassius actius (Eversmann, 1843)

TL. "Tarbagatai" (by the lectotype designation) (Korb 2017a: 7); "in promontoriis Altaicis australibus" (original description) ["Dzhungarian Alatau Mts., Tekeli gorge 15–20 km SE of Tekeli settlement" after correction].

Correction. This species was not recorded from Tarbagatai as far as from Southern Altai and surrounding areas (Toropov and Zhdanko 2014). Thus both its type localities, recovered from its original description (Southern Altai) and from the lectotype designation (Tarbagatai) are incorrect. The specimens used for the description have typical Dzhungarian 'face' and without doubts were collected in Dzhungarian Alatau Mts. There are two evidences for it. Firstly, the type specimen were collected for sure not in 1843: the journal where it was described was ready for publication in 16th June, 1843 (the Imperial Censorship Committee Resolution printed on the first page of the 3rd number of the *Bulletin de la Societe Imperiale des Naturalistes de Moscou* with this date) (the species flies in End of June – July). Secondly, the only expeditions reached the mountains where *P. actius* occur (Dzhungarian Alatau Mts.) till 1842 are the expeditions of Schrenk (Maslova 1955) (see in details: *Parnassius apollonius*). Most likely the types of *P. actius* collected in the second trip of Schrenk when in July (it is actually flight period of *P. actius*) he started his way back for wintering. His expedition was working 12 days in Tekeli gorge of Dzhungarian Alatau Mts.; there are no other expeditions before 1842 which hits right time to collect this species. Thus, I correct the type locality of *P. actius*: Dzhungarian Alatau Mts., Tekeli gorge 15–20 km SE of Tekeli settlement.

Distribution. Central Asiatic mountains.

Parnassius epaphus Oberthür, 1879

TL. "Tibet" (by the lectotype designation) (Ackery 1973: 5) ["Ladak in Himalayas" after correction].

Correction. The name *epaphus* proposed for the specimens listed by Gray (1853) as *P. jacquemontii* Boisduval 1836 from "Chinese Tartary at an elevation of 15,000 feet". Under the name Chinese Tartary in the English entomological literature of 18–19 centuries meant Ladak but not Tibet. Elwes (1886: 36) wrote: "I have been able to find out the route which Major Charlton followed in Ladak, or Chinese Tartary as it was called in those days…". Thus the type locality of *P. epaphus* is Ladak but not Tibet; additional argument to this conclusion is that Major Charlton never did such a long trips, all his trips were limited by the northern and north-eastern limits of the Indian parts of the British Empire between 1825 and 1840 (Paget 1874, 1907). Guided by these two reasons I must correct the type locality of *P. epaphus* as "Ladak in Himalayas".

Distribution. Tibet, Himalayas, Kun-Lun, Karakorum.

Parnassius dongalaicus Tytler, 1926

TL. "Donga La" (a mountain pass located on the highway Bumthang – Ura in Bhutan, 27.394808 N, 90.9953358 E).

Remarks. It described as a good species by a single female which now deposited in the British Museum. For the long time its status was questionable after the comment of Bryk (1935: 279): "Nach der gekielten Sphragis der weiblichen Type gehört diese Unterart nicht zu *P. epaphus* C. Oherth., aber ihre Facies ist so *epaphus*-artig, daß eine Begattung mit dieser Art wahrscheinlich ist, zumal sogar Begattung zwischen sehr weit voneinander entfernten Arten wie *Lingamius hardwickei* (I.E. Gray) und *P. epaphns* C. Oberth. festgestellt wurde" [By its sphragis equipped by a keel, the type female of this subspecies cannot be *P. epaphus*, however its fascia looks so close to *P. epaphus*, so it can be a result of crossbreeding between very distant species like *Lingamius hardwickei* and *P. epaphns*]. The species rank was returned to it by Weiss (2005) and supported by Kocman (2009).

Distribution. South Tibet, Bhutan.

Parnassius jacquemonti Boisduval, 1836

TL. "Himalayas" (by the lectotype) (Ackery 1973: 5) ["in the Indian Himalayas near the border with Western Tibet" after correction (Kocman 2009: 11)].

Distribution. Pamir, Alai, Ghissar, Darvaz, Badakhshan, Hindukush, Karakorum, Himalayas, eastern part of Tibet.

Parnassius mercurius Grum-Grshimailo, 1890

TL. "in regioni Amdo dicta, in montibus at Sinin repertus" (original description) ["mountains between rivers Myn-Da-Sha and Gui-Da-Sha (approximate coordinates: 36.300–36.383 N and 101.500–101.650 E)" after correction].

Correction. Regarding the description of the Grumm-Grshimailo's journey to West China (Grumm-Grshimailo 1907) the locality where the type specimens of this species have been collected located in the mountains between rivers Myn-Da-Sha and Gui-Da-Sha (approximate coordinates: 36.300–36.383 N and 101.500–101.650 E). Thus I correct its type locality according abovementioned data.

Remark. The superspecies *P. jacquemonti* was recently redrawn by Weiss (2005) and Weiss and Rigout (2016): taxa *actinobolides* Bang-Haas, 1928, *rubicundus* Stichel, 1906, *tibetanus* Rühl, 1893 and *mercurius* were raised to the species rank. I support this opinion partially: comparison of COI sequences of the closely related taxa *actinobolides*, *tibetanus*, *rubicundus* and *mercurius* showed up that 3 of them have not enough differences (p-distances less than 1%) to treat them as good species (Korb 2012); the only taxon which COI sequence differs enough from all of the above listed taxa and from *P. jacquemonti* is *mercurius*.

Distribution. Tibet, Eastern Himalayas.

Parnassius tianschanicus Oberthür, 1879

TL. "Forêt de Kouldja et du Tianschan" (original description) ["East Tian-Shan between lake Sairam-Nur and city of Kuldja" after correction].

Correction. "Forêt de Kouldja et du Tianschan" – this locality pointed to the Chinese part of Tian-Shan (East Tian-Shan between lake Sairam-Nur and city of Kuldja). Thus the type locality of *P. tianschanicus* must be corrected to "East Tian-Shan between lake Sairam-Nur and city of Kuldja".

Distribution. Mountains of Central Asia.

Parnassius olympius Staudinger, 1891

TL. "…in den unfern der centralasiatischen Stadt Korla (oder Kurla) gelegenen Gebirgen, wohl in dem östlich davon liegenden Kuruk-Tau, gefunden" (original description); "Korla" (by the lectotype designation) (Korb 2012: 34).

Remark. Species rank given after study of its type series (Korb 2012).

Distribution. Known only from the type locality.

Parnassius nomion Fischer de Waldheim, 1823

TL. "Dauria" (original description); "Onon Anfang", "Russia, Transbaikal, environs of the Kyakhta city, coordinates: 50°212003N, 106°272003E" after the neotype designation (Korb 2019: 205).

Remark. Very variable species with many subspecies and aberrations described. Some of them (*richthofeni* Bang-Haas, 1927, *koiwayai* Ohya et Inomata, 1988, *gabrieli* Bryk, 1934 and others from the *nomius* Grumm-Grshimailo, 1891 clade) looks like different species but according its DNA and male genitalia they are without doubts the same species.

Distribution. North and Middle Ural, Mountains of South Siberia and Far East in the borders of Russia, Bayanaul Mts. in Kazakhstan (Pavlodar Area), Mongolia, China and Korea; North-East Tibet. Its distribution in North and Middle Ural confirmed by the following materials: "1 ♂, North Ural from E. Sablya to Lun-Sablya, 5.07.1909 (Suravsky); 1 ♂, North Ural between mountains Voi-Sablya and Lun-Sablya, 18.08.1909; 1 ♂, North Ural, Shugor river, 27.07.1973 (Shubina); 1 ♂, Middle Ural, Sverdlovsk Prov., Karpushikha env., 24.07.1988 (Sotnikov)" (Kreuzberg and Pliustsh 1992: 78).

Parnassius apollo (Linnaeus, 1758)

TL. "in Suecia" (original description); ["Sweden, near the city of Uppsala" after correction].

Correction. The place where Linnaeus lived in Sweden was Uppsala; main part of his collection was collected here (Honey and Scoble 2001); most likely the type specimens of *P. apollo* too. The materials Linnaeus collected "near his home" were basically without the geography labels, including the lectotype of *P. apollo* (Honey and Scoble 2001: 298). Due to these reasons I must correct the type locality of this species to "Sweden, near the city of Uppsala".

Remark. Very variable species, hundreds, if not thousands, species group taxa were described. The modern book about this species (Glaßl 2017a) listed 296 subspecies of it.

Distribution. Europe (northwards to Central Sweden), Caucasus, Transcaucasus, Ural, West Siberian plain, Mongolia, South Siberian mountains, Dzhungarian Alatau Mts., Boro-Khoro Mts., North Tian-Shan. Its records from West Tian-Shan (Talassky Mts.) and from Inner Tian-Shan (Suusamyrtoo, Naryntoo and At-Bashi Mts.) (Tshikolovets 2005) are questionable.

Genus *Tadumia* Moore [1902]. TS: *Parnassius acco* Gray, 1852 (original designation).

Tadumia hardwickii (Gray, 1831)

TL. "Nepal" (by the syntype) (Ackery 1973: 15).

Note. The species described "…from the collection of General Hardwicke…" (Gray 1831: 32) from Nepal. It is no possibility to recover the exact type locality of *T. hardwickii*; General Hardwicke was a great English naturalist and he did many trips to the English India and surrounding areas which are not described good enough to determine the right one (Dawson 1946).

Distribution. Himalayas, southern and western limits of Tibetan plateau.

Tadumia acco (Gray, 1852)

TL. "from Chinese Tartary, where it is found on the plateau 16,000 feet high" (original description); ["Ladak in Himalayas" after correction].

Correction. See *P. epaphus*.

Note. Highly variable species. Many forms and subspecies have been described; some closely related species are in the "*acco*"-complex. The molecular and morphological data used to delineate the species inside of this complex group (Condamine 2018). I support Kocman (2009) in his opinion that the taxa treated before as the good species *przewalskii* (Alphéraky, 1887) and *baileyi* (South, 1913) are subspecies of *T. acco*.

Remark. In the last part of "The Parnassiinae of the World" (Weiss and Rigout 2016) mentioned '*Parnassius cheungensis* Zhang, 2010' which considered to be a synonym of *T. acco* in the same book.

Distribution. Tibet, Karakorum, North-West Himalayas.

Tadumia huberi (Paulus, 1999)

TL. "near Tanggula Shankou, Tanggula Mts.-Tibet-China 5200-5500 m in alt." (original description).

Remark. The species status supported by molecular studies of Condamine (2018).

Distribution. Four localitites known at current time: "Denka Shan, Tanggula Shankou, 30km SW of Baqen, 70km W of Sok" (Kocman 2009: 95), all in Central Tibet.

Tadumia schultei (Weiss et Michel, 1989)

TL. "nord de Lhassa, 5000-5300 m, Tibet central" (original description).

Remark. The species status supported by molecular studies of Condamine (2018).

Distribution. Four localitites known at current time: "Karo La, Monda La, Yung La, 20km S of Gyantse" (Kocman 2009: 94), all in central part of Southern Tibet.

Tadumia hunnyngtoni Avinoff, 1916

TL. "from high elevations near the Chumbi Valley, South Tibet" (original description) ["Chumbi valley 200 km away from the Everest Mt. in the south-eastern direction" after qualification].

Qualification. Chumbi valley (27.383 N, 88.883 E) located on the borders of India, China and Bhutan; several authors erroneously placed the type locality of *T. hunnyngtoni* to the slopes of the Everest Mt., but the Chumbi valley is 200 km away from this mountain in the south-eastern direction.

Distribution. Southern Tibet in the borders of Nepal, Sikkim and Bhutan.

Tadumia maharaja (Avinoff, 1916)

=*T. labeyriei* (Weiss et Michel, 1989)
=*T. nosei* (Watanabe, 1990))

TL. "on desolate stony slopes near the crest of the Tagalang-la Pass (Rupshu), 18,000 feet, and in the vicinity of Sugetdavan (Chinese Turkestan)" (original description).

Qualification. Tagalang-La Pass (or Taglang-La Pass) is located in Ladak (33.507778 N, 77.77 E); Sugetdavan Pass is located in Kashgaria (38.316667 N, 75.433333 E).

Remark. The comparison of the COI sequences between the taxa *maharaja* and *labeyriei* Weiss et Michel, 1989 (Korb 2012) showed the differences only 0.7 %, and it is definitely not enough to treat *labeyriei* as a separate species but only as a subspecies of *T. maharaja*. The taxon *nosei* Watanabe, 1989 was not studied yet by molecular methods but the male genitalia of it are identical to *T. maharaja*, thus this taxon is also a subspecies of the latter.

Distribution. Ladak, Karakorum, Tibet, West Himalayas.

Tadumia szechenyii (Frivaldszky, 1886)

=*T. choui* (Huang et Shi, 1994)

TL. "in Tibet ad lacum Kuku-noor" (original description).

Qualification. Lake Kukunor (37° N, 100° E) located in Tibet, Qinghai Province of China.

Distribution. Eastern and partially Central Tibet and the surrounding areas.

Tadumia cephalus (Grum-Grshimailo, 1891)

TL. "in regione alpine Amdo dicta, in montibus ad Sinin detectus" (original description); ["mountains between rivers Myn-Da-Sha and Gui-Da-Sha (approximate coordinates: 36.300–36.383 N and 101.500–101.650 E)" after correction].

Correction. See *Parnassius mercurius*.

Distribution. Tibet, Central and Eastern Himalayas.

Genus *Sachaia* Korschunov, 1988. TS: *Parnassius tenedius* Eversmann, 1851 (original designation).

Sachaia arctica (Eisner, 1968)

TL. "in den Bergen östlich von Werchnosensk" (original description).

Note. Its type locality (mountains eastwards of Verkhoyansk) is not clear. Korshunov (1988: 68) think that it can be Yana plateau or Chersky Mts., but he did not prove it.

Distribution. East Siberian mountains: Suntar-Khayata, Verkhoyansky, Cherskogo Mts.

Sachaia tenedius (Eversmann, 1851)

TL. "Irkutzk" (by the lectotype designation) (Korb and Bolshakov 2016: 42).

Distribution. The mountains of Siberia in the borders of Russia, Mongolia and North China; Saur.

Genus *Kreizbergius* Korshunov, 1990. TS: *Parnassius simo* Gray, 1853 (original designation).

Kreizbergius boedromius (Püngeler, 1901)

TL. "Aksu" (by the lectotype designation) (Korb and Bolshakov 2016: 43) ["mountains northwards of the city of Aksu near the Khan-Tengri peak" after qualification].

Qualification. In the foreword to the paper, where *K. boedromius* have been described, stated, that Rückbeil brothers collected mostly in the mountains northwards of the city of Aksu in the Chinese part of Tian-Shan. It is a connection of the mountain ranges Kokshaaltoo, Sary-Dzhaz and Inylchektau near the Khan-Tengri peak; this species recorded many times from this area. Some of the specimens collected by Rückbeil brothers are equipped with labels "Chantengri" or "Chantengrin". Thus, I must make qualification: the type locality of *K. boedromius* is "mountains northwards of the city of Aksu near the Khan-Tengri peak".

Distribution. Tian-Shan.

Kreizbergius simo (Gray, 1853)

TL. «from Chinese Tartary, and discovered on the plateau 16,000 feet high» (original description) ["Ladak in Himalayas" after correction].

Correction. See *P. epaphus*.

Distribution. Widely distributed in the mountains of Central Asia except for Tian-Shan.

Kreizbergius simonius (Staudinger, 1889)

=*K. andreji* (Eisner, 1930)

TL. "in einer sehr bedeutender Höhe (4-5000 Meter) im Pamir-Gebiet (oder Transalai?)" (original description) ["western part of Transalai Mts." after correction].

Correction. Avinov (1913: 12) corrected its type locality to the western part of Transalai Mts.

Remark. The specific rank of *andreji* was downgraded basing on the male genitalia studies (including type specimens) and COI sequences (Korb 2018b).

Distribution. Widely distributed in the Central Asiatic mountains; in Tian-Shan local, confirmed only from the several localities in Moldo-Too Mts.

Genus *Koramius* Moore, 1902. TS: *Doritis delphius* Eversmann, 1843 (original designation).

Subgenus *Koramius* sensu stricto

Koramius (s. str.) *hide* (Koiwaya, 1987)

TL. China, Qinghai Prov., eastern part of Kun-Lun, Baen-Khar Pass (original description; translated from Japanese).

Qualification. Coordinates of the type locality: 36.183 N, 94.250 E.

Distribution. Kun-Lun Mts., Central, Southern and South-Eastern Tibet; probably Central Himalayas.

Koramius (s. str.) *patricius* (Niepelt, 1911)

TL. "Tian-schan Gebirge, Turkestan" (by the lectotype designation (Eisner 1966: 48)) ["Tian-Shan, possibly Naryn vicinities"].

Remark 1. Kreuzberg (1985: 31) listed a female holotype of this species deposited in the Rijksmuseum van Natuurlijke Histoire (Leiden, Netherlands). But Niepelt (1911: 274) listed in the original description two females and no holotype was selected by him. The holotype status was given to one of them by Eisner (1966: 48); thus, he designated a lectotype (Art. 74.5 of the Code). Referring to the original description, Kreuzberg stated the type locality of this taxon as "Tianschan, Narynsk", but in the original description this is not stated. "Narynsk" is a label of the paralectotype (Eisner 1966: 48). The situation with its type locality looks quite unclear. The locality of the paralectotype cannot be used as the type locality of *K. patricius* because it will violate the Code; also, we don't know for sure if both specimens were collected together or not. Thus we can use the assumption that both specimens were collected together: "Tian-Shan, possibly Naryn vicinities".

Remark 2. Häuser (1993: 141) raised the taxon *priamus* (Bryk, 1914) to the species rank. Kreuzberg (1985: 31) designated a neotype of this taxon basing on incorrect assumption that the Bryk's types must be deposited in the collection of Avinov (currently Zoological Institute of the Russian Academy of Sciences, St.-Petersburg, Russia) and have not been found here by him. Bryk (1914: 25) wrote that the type series (1 ♂, 1 ♀) collected in «Chantengrin (Aksu)» and deposited in the Bang-Haas' collection (currently Museum für Naturkunde, Berlin, Germany). Later one of the types found by Kreuzberg in Museum für Naturkunde and he selected a lectotype, but the nomenclatural act of the lectotype designation was never published. The lectotype of *priamus* have been designated by me (Korb 2012: 31). Lukhtanov et al. 2016 proved that the taxon *priamus* is a subspecies of *K. patricius*.

Distribution. Tian-Shan.

Koramius (s. str.) *stoliczkanus* (C. Felder et R. Felder, [1865])

TL. "Ladak: Marka, Rupshu" (original description).

Qualification. The Marka river valley located in the state of Rupshu (Southern Ladak; 33.93 N, 77.28 E).

Distribution. Himalayas, West Tibet.

Koramius (s. str.) *kumaonensis* (Riley, 1926)

=*K.* (s. str.) *nandadevinensis* (D.Weiss, 1990
=*K.* (s. str.) *nobuko* (Ohya, 1996)

TL. "N. Kumaon, Shillung" (original description).

Qualification. The Sin La Pass (other names: Shillung, Singling) located in the region of Pitoragarh of the Indian state Uttarahand (30° 19'10"N, 80° 38'12" E).

Remark. The taxa *nandadevinensis* and *nobuko* synonymized by Rose and Weiss (2011).

Distribution. Himalayas.

Koramius (s. str.) *stenosemus* (Honrath, 1890)

TL. "Ladak" (original description).

Distribution. Ladak, Himalayas.

Koramius (s. str.) *delphius* (Eversmann, 1843)

=*K. maximinus* (Staudinger, 1891)

TL. "Tarbagatai" (by the lectotype designation (Kreuzberg 1985: 42) ["Dzhungarian Alatau Mts., Tekeli gorge 15–20 km SE of Tekeli settlement" after correction].

Correction. See *Parnassius actius*.

Remark. Recently the conclusions of Kreuzberg (1985) regarding the systematics of the *delphius*-group were critically rearranged (Churkin 2009; Lukhtanov et al. 2016); it was proved that the taxon *maximinus* is not a good species. The situation with the type material of *maximinus* is entangled. Tshikolovets et al. (2016: 83) listed the «lectotype ♂» from Museum für Naturkunde, Berlin, Germany, referring to Bergmann (1995). However, Bergmann (loc. cit.) did not publish any lectotype designation; he just wrote that the lectotype was designated by Kreuzberg in 1985. Kreuzberg published no designation of the lectotype of *maximinus* (Kreuzberg 1985: 45); according its labels, he selected the lectotype in 1989 but this designation has not been published too. Thus, both Bergmann and Tshikolovets et al. treated as a lectotype one of the syntypes; the lectotype designated by me (Korb 2017b: 12).

Distribution. Tian-Shan.

Koramius (s. str.) *cardinal* (Grum-Grshimailo, 1887)

=*K.* (s. str.) *divinus* (Bryk et Eisner, 1931)
=*K.* (s. str.) *hunza* (Grum-Grshimailo, 1888)
=*K.* (s. str.) *chitralica* (Verity, 1911)

TL. "zum Flecken Tuptschek und an den Fuss des Kara-Schar (über 20,000 Fuss)" (original description); "Darvaz, Mts. Pierre le Grand" (by the lectotype designation) (Korb 2017a: 8); ["Gardani-Kaftar Pass (38.95 N, 71.70 E) in the Peter the Great Mts" after qualification].

Qualification. Tuptshek Plateau located in the Peter the Great Mts. near the confluence of Muksu and Kyzylsu rivers; this plateau is finished by the Gardani-Kaftar Pass (the other name: Kara-Shar Pass) (38.95 N, 71.70 E). This place, mentioned in the original description, is a classical site for collecting of *K. cardinal* and it is a type locality of this taxon because the Tuptshek plateau elevation (about 2000 m) is not suitable for this high mountainous species. Thus I qualify the type locality of this species as Gardani-Kaftar Pass in the Peter the Great Mts.

Remarks. Korb (2010) basing on the structure and evolution of the wing pattern raised to the species rank taxa *divinus* and *chitralica*. Lukhtanov et al. 2016 using the molecular data synonymized these taxa as far as taxa *ruth* Kotzsch, 1936 and *hunza* to *K. cardinal*. I support the opinion of Lukhtanov et al.; the male genitalia of all these taxa are almost identical.

Distribution. Gissar, Darvaz, Pamir, Hindukush, Badakhshan.

Koramius (s. str.) *infernalis* (Elwes, 1886)

=*K.* (s. str.) *kiritshenkoi* (Avinov, 1910)
=*K.* (s. str.) *illustris* (Grum-Grshimailo, 1888)

TL. "Osch" (by the lectotype designation) (Korb 2015: 16) ["Alai Mts. near the city of Osh" after correction].

Correction. The type locality of this species must be stated as "Alai Mts. near the city of Osh".

Remark. Lukhtanov et al. 2016 on the basis of the molecular data placed the taxa *darvasicus* Avinov, 1916, *inaccessibilis* Shchetkin, 1977, *dunkeldykus* Sotshivko et Kaabak, 1996, *mustagata* Rose, 1990, *kiritshenkoi*, *illustris* into *K. infernalis* as its subspecies or synonyms. Two latter ones were treated before as separate species.

Distribution. Inner Tian-Shan, Pamir-Alai, Gissar, Darvaz.

Koramius (s. str.) *abramovi* (O.Bang-Haas, 1915)

TL. "Schahidulla / Chotan mer. / … 4500 m" (by the lectotype designation) (Korb 2012: 30 – 31); ["mountains (up to 4200 m) around the city of Shahidulla" after qualification].

Qualification. Schahidulla is a city in China (36°24'N, 77°59'E) located at the altitude 3646 m. Obviously it is the type locality of this taxon: mountains (up to 4200 m) around the city of Shahidulla.

Distribution. Kun-Lun.

Koramius (s. str.) *shaposhnikovi* (Korb, 2010)

TL. "Tajikistan, Shakhdarinsky Mts., 24 km from Khorog, upper course of Pan-Dara river" (original description).

Qualification. The river Pan-Dara located near Roshtkata (37.7417N, 72.18501E).

Remark. In the recently published Parnassiinae book (Weiss and Rigout 2016) without any explanations this taxon synonymized to *K. jacobsoni* (Avinoff, 1913). The taxon *shaposhnikovi* was described on the base of the wing pattern differences and flies sympatrically with *jacobsoni*. It has good differences from *jacobsoni* in the male genitalia described in details and illustrated by Korb (2014).

Distribution. Only known from the type locality.

Koramius (s. str.) *jacobsoni* (Avinoff, 1913)

TL. "Pamirsky Post" (by the lectotype designation) (Kreuzberg 1985: 40).

Qualification. Current name of Pamirsky Post is Murgab settlement in the Gorno-Badakhshanskaya Prov. of Tajikistan located at the altitude of 3612 m; coordinates: 38.168889 N, 73.965 E; sometimes these butterflies can be collected even inside of the settlement.

Distribution. Pamir, Darvaz, Badakhshan.

Koramius (s. str.) *staudingeri* (A.Bang-Haas, 1882)

TL. "auf dem Hazret-Sultan Gebirge".

Qualification. Hazreth-Sultan is a mountain in Gissar Mts. (4643 m; coordinates: 38.948333N, 68.172222E).

Distribution. Pamir, Alai, Gissar, Darvaz, Badakhshan.

Koramius (s. str.) *acdestis* (Grum-Grshimailo, 1891)

TL. "in regione alpina Amdo dicta, in montibus ad Sinin"; ["mountains between rivers Myn-Da-Sha and Gui-Da-Sha (approximate coordinates: 36.300–36.383 N and 101.500–101.650 E)" after correction].

Remark. See *Parnassius mercurius*.

Distribution. Himalayas, Tibet.

Subgenus *Kailasius* Moore [1902]. TS: *Parnassius charltonius* Gray, 1853 (original designation).

Koramius (*Kailasius*) *charltonius* (Gray, 1852)

TL. "from Chinese Tartary, where it was found… at an elevation of 15,000 feet"; ["Ladak in Himalayas" after correction].

Correction. See *Parnassius epaphus*.

Remark. The species status given to the taxon *romanovi* Grumm-Grshimailo, 1885 by molecular data (Churkin and Michel 2014) downgraded back to the subspecies (Korb et al. 2016) basing on the molecular data.

Distribution. Southern spurs of Tian-Shan (Dzhaman-Too Mts.), Pamir, Alai, Gissar, Darvaz, Badakhshan, Karakorum, Ladak, Chitral, Hindukush, Tibet, Himalayas.

Koramius (*Kailasius*) *autocrator* (Avinov, 1913)

TL. "in the area of Gushkhon Pass, Vanchsky Mts." (after correction) (Kreuzberg 1985: 48).

Distribution. Pamir, Badakhshan, South-East Alai.

Koramius (*Kailasius*) *inopinatus* (Kotzsch, 1940)

TL. "Nodrwest-Afghanistan, Firuskuhi-Mont, Alpenwiesenzone, 2800–3000 m"; ["Firus-Kuh Mts. near Bamian settlement" after correction].

Correction. Firus-Kuh Mts. is a mountain ridge located northwards from the mountain range Koh-i-Baba. Most of materials collected by Kotzsch in this mountain range in the Bamian valley, but the place where he found this species he kept in secret due to its high commercial value. As Bamian settlement was the place of residence during his trips to Afghanistan, I must correct the type locality of this taxon as "Firus-Kuh Mts. near Bamian settlement".

Distribution. Afghanistan: Firus-Kuh and Kokh-i-Baba Mts., Pakta Prov.

Koramius (*Kailasius*) *davydovi* (Churkin, 2006)

TL. "Tian-Shan, Moldo-Too Mts., Sary-Bulac loc., 2500–2600 m" (original description); ["Sary-Bulak near Koro-Goo Pass in Moldo-Too Mts." after correction].

Correction. The type locality of this taxon camouflaged under the neutral toponym "Sary-Bulak". This name (translation: Yellow Spring) is very common in Kyrgyzstan (as far as other names formed from water sources: Kara-Bulak (Black Spring), Ak-Bulak (White Spring) etc.). In Molddo-Too Mts. there are about 30 localities with same name. The locality Sary-Bulak, mentioned in the original description, located near the Koro-Goo Pass on the road between Naryn and Kazarman; thus, the type locality must be corrected to this location.

Distribution. Inner Tian-Shan: Moldo-Too Mts.

***Koramius* (*Kailasius*) *loxias* (Püngeler, 1901)**

TL. "Aksu"; ["mountains northwards of the city of Aksu near the Khan-Tengri peak" after qualification].

Correction. See *Kreizbergius boedromius*.

Distribution. Central Tian-Shan.

***Koramius* (*Kailasius*) *imperator* (Oberthür, 1883)**

TL. "de Tât-sien-loû".

Qualification. Ta-Tsien-Lu is a small village near Gardze city in the South-Eastern Tibet (Sichuan Prov., China), the current name of this place is Kanding (coordinates: 30.00 N, 101.57 E).

Distribution. East and Central Tibet, South-East and Central Himalayas.

***Koramius* (*Kailasius*) *augustus* (Fruhstorfer, 1903)**

TL. "von der Sikkim Tibetanischen Grenze, gefangen auf 18,000'".

Distribution. South Tibet, Central Himalayas.

Acknowledgements

I am greatly indebted to Dr A.V. Sviridov (Zoological Museum of the Moscow University, Moscow, Russia), Dr A.L. Lvovsky and Dr S.Y. Sinev (Zoological Institute of the Russian Academy of Sciences, St.-Petersburg, Russia), Dr W. Mey (Museum für Naturkunde, Berlin, Germany), Dr P. Ackery and Dr B. Huertas (British Museum, London, UK), Dr A. Hausmann (Zoologische Staatssammlung, München, Germany), Dr L. Kaila and Dr J. Kullberg (Finnish Natural History Museum, Helsinki, Finland) for granting access to curated collections.

References

Ackery PR (1973) A list of the type-specimens of *Parnassius* (Lepidoptera: Papilionidae) in the British Museum (Natural History). Bulletin of the British Museum (Natural Histoty) Entomology 29: 3–35. https://doi.org/10.5962/bhl.title.118835

Ackery PR (1975) A guide to the genera and species of Parnassiinae (Lepidoptera: Papilionidae). Bulletin of the British Museum (Natural Histoty) Entomology 31: 73–105. https://doi.org/10.5962/bhl.part.29484

Asahi JI, Kanda S, Kawata M, Kohara YI, Fujioka T (1999). The butterflies of Sakhalin in nature. Sapporo: Hokkaido Simbun. 311 p. [in Japanese].

Avinov AN (1913) On the new forms of the genus *Parnassius*. Horae Societatis entomologicae Rossicae 40(5): 1–21 [in Russian].

Austaut JL (1889) Les Parnassiens de la faune paléarctique. Leipzig: Heyne Verlag. 222 S. https://doi.org/10.5962/bhl.title.9247

Balletto E, Bonelli S (2014) Case 3637. *Papilio phoebus* De Prunner, 1798: proposed conservation in its accustomed usage by suppression of *Papilio phoebus* Fabricius, 1793 (Insecta, Lepidoptera, Papilionidae). Bulletin of the Zoological Nomenclature 71(2): 75–80. https://doi.org/10.21805/bzn.v71i2.a6

Bobrov EG (1970) Carl Linnaeus. 1707–1778. Leningrad: Nauka. 285 p. [in Russian].

Bogdanov MN (1875) A review of the expeditions and nature-historical researches in the Aral-Caspian area from 1720 to 1874. Proceedings of the Aral-Caspian expedition 1: 1–53 [in Russian].

Bremer O (1864) Lepidopteren Ost-Sibiriens, insbesondere des Amur-Landes, gesammelt von den Herrn G. Radde, R. Maack und P. Wulffius. Mémoires de l'Academie Imperiale des Sciences de St.-Petersbourg Ser. VII 8(1): 1–248. https://doi.org/10.5962/bhl.title.62141

Bryk F (1914) Parnassiana XIV. Ein neuer *Koramius* (*Tadumia*) *acdestis* Gr. Gr. subsp. *priamus* B.-Hs. i.l. Societas Entomologica 24: 24–25.

Bryk F (1935) Lepidoptera Parnassiidae pars II. (Subfam. Parnassiinae). Das Tierreich 65: 1–790. https://doi.org/10.1515/9783111430119-004

Churkin SV (2009) Notes on *Parnassius* Latreille, 1804 from Tian-Shan and Alai. Part 2: *Parnassius staudingeri* A. Bang-Haas, 1882 – *Parnassius delphius* Eversmann, 1843 (Lepidoptera, Papilionidae). Atalanta 40: 436–460.

Churkin SV, Michel F (2014) Analyses of morphology and mitochondrial DNA reveal a deep split within *Parnassius charltonius* Gray, [1853] (Lepidoptera, Papilionidae). Atalanta 45: 97–125.

Condamine FL (2018) Limited by the roof of the world: mountain radiations of Apollo swallowtails controlled by diversity dependence processes. Biology Letters 20170622. http://dx.doi.org/10.1098/rsbl.2017.0622.

Dawson WR (1946) On the history of Gray and Hardwicke's Illustrations of Indian zoology, and some biographical notes on General Hardwicke. Journal of the Society for the Bibliography of Natural History 2(3): 55–69. https://doi.org/10.3366/jsbnh.1946.2.3.55

Eisner C (1974) Parnassiana Nova XLIX. Die Arten und Unterarten der Baroniidae, Teinopalpidae und Parnassiidae (Erster teil) (Lepidoptera). Zoologische Verhandelingen 135: 1–96.

Elwes HJ (1886) On butterflies of the genus *Parnassius*. Proceedings of the zoological Society of London 1886: 6–52.

Eversmann E (1847) Lepidoptera quaedam nova Rossiae et Sibiriae indigena descripsit et delineavit Dr. Eduardus Eversmann. Bulletin de la Societe Imperiale des Naturalistes de Moscou 20(3): 66–83.

Ford EB (1944) Studies on the chemistry of pigments in the Lepidoptera, with references to their bearing on systematics. 4. The classification of the Papilionidae. Transactions of the Royal Entomological Society of London 94: 201–223. https://doi.org/10.1111/j.1365-2311.1944.tb01217.x

Glaßl H (2017a) *Parnassius apollo*: Seine Unterarten. 3rd Edition. Möhrendorf: Glaßl Press. 364 S.

Glaßl H (2017b) *Parnassius mnemosyne*. Möhrendorf: Glaßl Press. 142 S.

Glustshenko YN, Martynenko AB (1998) Variation of Yellow Parnassian of the group *eversmanni-felderi* in the South of Russian Far East. A.I. Kurentsov's Annual Memorial Meetings 8: 41–56 [in Russian].

Gratton P, Sbordoni V (2005) Conservation genetics and phylogeography of *Parnassius mnemosyne*. Pensoft Series Faunistica 52: 41–44.

Gratton P, Todisco V, Sbordoni V (2006) Filogeografia comparata di *Parnassius apollo* e *P. mnemosyne*. Un contributo genetico-molecolare alla biogeografia dell'Appenino. Biogeographia 27: 277–289. https://doi.org/10.21426/b6110005

Gratton P, Konopiński MK, Sbordoni V (2008) Pleistocene evolutionary history of the Clouded Apollo (*Parnassius mnemosyne*): genetic signatures of climate cycles and a 'time-dependent' mitochondrial substitution rate. Molecular Ecology 17: 42–48. https://doi.org/10.1111/j.1365-294x.2008.03901.x

Gray JE (1853) Catalogue of Lepidopterous insects in the collection of the British Museum. Part I. Papilionidae. London: British Museum. 81 p. https://doi.org/10.5962/bhl.title.46882

Gray GR (1831) Descriptions of eight new species of Indian butterflies, (*Papilio*, Lin.) from the collection of General Hardwicke. The zoological Miscellany London: Treutell, Wurtz and Co. 32–33.

Grumm-Grshimailo G (1907) A description of the journey into West Tian-Shan. Vol. 3. Around Kuku-Noor, through Nan-Shan, Bei-Shan and East Tian-Shan back home. St.-Petersburg: Imperial Russian Geographical Society. 531 p. [in Russian].

Hancock DL (1983) Classification of the Papilionidae (Lepidoptera): a phylogenetic approach. Smithersia 2: 1–48.

Hanus J, Theye ML (2010) *Parnassius phoebus* (Fabricius, 1793), a misidentified species (Lepidoptera: Papilionidae). Nachrichten des entomologischen Vereins Apollo. N.F. 31(1/2): 71–84.

Hanus J, Theye ML (2013) Les premiers *Parnassius*: histoire de leur découverte, de leur description et de l'erreur d'identification de *Parnassius phoebus* (Fabricius, 1793) (Lepidoptera Papilionidae). Alexanor 25(6): 323–354.

Häuser CL (1993) An annotated checklist of the species of the Parnassiinae (Lepidoptera: Papilionidae). Tijdschrift voor Entomologie 136: 137–146.

Higgins LG (1975) The classification of European butterflies. London: Collins. 320 p.

Hiura I (1980) A phylogeny of the genera of Parnassiinae based on analysis of wing pattern, with description of a new genus (Lepidoptera: Papilionidae). Bulletin of the Osaka Museum of Natural History 33: 71–85.

Honey MR, Scoble MJ (2001) Linnaeus's butterflies (Lepidoptera: Papilionoidea and Hesperioidea). Zoological Journal of the Linnean Society 132: 277–399. https://doi.org/10.1111/j.1096-3642.2001.tb01326.x

Igarashi S (1984) The classification of the Papilionidae mainly based on the morphology of their immature stages. Tyô to Ga 34: 41–96.

Koçak AO (1989) Description of the genus *Adoritis* (gen. n.) with notes on other closely related groups in Parnassiinae (Papilionidae, Lepidoptera). Priamus 4: 163–170.

Kocman S (2009) *Parnassius* of Tibet and the adjacent areas. Pardubice: Tshikolovets Publications. 224 p.

Korb SK (2010) Evolution of wing pattern, island effect and the questions of the systematics of the butterflies of the superspecies *Parnassius staudingeri* A. Bang-Haas, 1882 (Lepidoptera, Papilionidae). Altai Zoological Journal 4: 15–31 [in Russian].

Korb SK (2012) Systematics of the tribus Parnassiini (Lepidoptera: Papilionidae) based on the investigations of four genes and imago morphology. Eversmannia 31-32: 5–37 [in Russian].

Korb SK (2013) Subspecies structure of *Parnassius apollo* (Linnaeus, 1758) (Lepidoptera: Papilionidae). Eversmannia 33: 5–9 [in Russian].

Korb SK (2014) Recension on the book "D.V. Dubrovsky, K.Y. Vodyanov. Systematical and zoogeographical review of some groups of butterflies (Lepidoptera, Papilionoidea) of Pamir. Voronezh, Kvarta, 76 p. Eversmannia 40: 63–67 [in Russian].

Korb SK (2015) Butterflies of Inner Tian-Shan (Lepidoptera: Papilionoformes). Eversmannia Suppl. 6: 1–84 [in Russian].

Korb SK (2016) Studies of Palaearctic Parnassiinae (Lepidoptera: Papilionidae): the status of *Parnassius bremeri amgunensis* Sheljuzhko, 1928. Entomologist's Gazette 67: 79–81.

Korb SK (2017a) Designation of the primary types of Parnassiinae (Lepidoptera: Papilionidae). Eversmannia 51-52: 6–9 [in Russian].

Korb SK (2017b) Butterflies of West Tian-Shan (Lepidoptera: Papilionoformes). Eversmannia Suppl. 7: 1–70 [in Russian].

Korb SK (2018a) Two *Parnassius* neotype designations (Lepidoptera: Papilionidae). Russian Entomological Journal 27(2): 203–206. https://doi.org/10.15298/rusentj.27.2.11

Korb SK (2018b) On three unpublished lectotype designations and on the status and positions of *Kreizbergius simo*-group taxa (Lepidoptera, Papilionidae). Entomologist's Gazette 69: 98–106. https://doi.org/10.31184/g00138894.692.1658

Korb SK, Bolshakov LV (2016) A systematic catalogue of butterflies of the former Soviet Union (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kyrgyzstan, Kazakhstan, Latvia, Lituania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan) with special account to their type specimens (Lepidoptera: Hesperioidea, Papilionoidea). Zootaxa 4160: 1–324. https://doi.org/10.11646/zootaxa.4160.1.1

Korb SK, Fric ZF, Bartonova A (2016) Phylogeography of *Koramius charltonius* (Gray, 1853) (Lepidoptera: Papilionidae): a case of too many poorly circumscribed subspecies. Nota lepidopterological 39(2): 169–191. https://doi.org/10.3897/nl.39.7682

Korshunov YP (1988). New butterflies (Lepidoptera, Rhopalocera) from Khakassia, Tuva and Yakutia. Taksonomiya zhivotnykh Sibiri. Novosibirsk: Nauka 65–80 [in Russian].

Korshunov YP (1990) New genera of the subfamily Parnassiinae Swainson, 1840. Chlenistonogie i gelminty. Novosibirsk: Nauka 99–105 [in Russian].

Kreuzberg AVA (1985) Butterflies of the groups *delphius*, *charltonius*, *simo* of the fauna of USSR. Issledovaniya flory I fauny Srednei Asii. Tashkent: Fan 25–68 [in Russian].

Kreuzberg AVA, Dyakonov AL (1993) Chemistry of the trophic relationships of the butterflies of subfamily Parnassiinae (Lepidoptera, Papilionidae). Bulletin of the Moscow Society of Naturalists 98(2): 3–14 [in Russian].

Kreuzberg AVA, Pliustsh IG (1992) New *Parnassius* butterfly subspecies (Lepidoptera, Papilionidae) from the East Palaearctics. Vestnik zoologii 92(2): 78–80 [in Russian].

Linnaeus C (1737) Flora lapponica exhibens plantas per Lapponiam crescentes, secundum systema sexuale collectas in itinere … 1732 institutio. Additis synonymis, and Locis natalibus omnium, descriptionibus and figuris rariorum, viribus medicatis and oeconomicis plurimarum. Amstelaedami: S. Schouten [35] + 372 + [16] p.

Lukhtanov VA, Pelham JP, Cotton AM, Calhoun JV (2019) Case 3767 – *Papilio phoebus* Fabricius, 1793 (currently *Parnassius phoebus*; Insecta, Lepidoptera): proposed conservation of prevailing usage of the specific name and that of *Doritis ariadne* Lederer, 1853 (currently *Parnassius ariadne*) by the designation of a neotype. Bulletin of the Zoological Nomenclature 76(1): 14–22. https://doi.org/10.21805/bzn.v76.a007

Lukhtanov VA, Sourakov A, Zakharov EV (2016) DNA barcodes as a tool in biodiversity research: testing pre-existing taxonomic hypotheses in Delphic Apollo butterflies (Lepidoptera, Papilionidae). Systematics and Biodiversity 14(6): 599–613. https://doi.org/10.1080/14772000.2016.1203371

Maslova OV (1955) A review of the Russian trips and expeditions to the Central Asia. Part 1. 1715–1856. Tashkent: SAGU 84 p. [in Russian].

Ménétriès E (1846) Sur quelques papillons de Sibérie recueillis par M. Stubbendorf. Bulletin de la Classe Physico-Mathématique de l'Académie Impériale des Sciences de St.-Pétersbourg 5(16-17): 262–265.

Michel F, Rebourg C, Cosson E, Descimon H (2008) Molecular phylogeny of Parnassiinae butterflies (Lepidoptera: Papilionidae) based on the sequences of four mitochondrial DNA segments. Annales de la Société entomologique de France 44(1): 1–36. https://doi.org/10.1080/00379271.2008.10697541

Moore F (1902) Rhopalocera. Family Nymphalidae, Riodinidae, Papilionidae. Lepidoptera Indica 5: 1–248. https://doi.org/10.5962/bhl.title.8763

Munroe E (1961) The classification of the Papilionidae (Lepidoptera). Canadian Entomologist Suppl. 17: 1–51. https://doi.org/10.4039/entm9217fv

Nekrutenko YP (1990) Butterflies of Caucasus. Vol. 1. Kiev: Naukova Dumka 216 p. [in Russian].

Nekrutenko YP, Kerzhner YM (1986) On the species and varieties of *Parnassius* (Lepidoptera, Papilionidae) established by E. Ménétriès in the book of Y. Siemashko "Russian fauna". Revue Russe de l'URSS 65(4): 769–778 [in Russian]. Niepelt W (1911) Neue palaearktische Macrolepidopteren. Internationale entomologische Zeitung 5: 274–275.

Oberthür C (1891) Lépidoptères du genre *Parnassius*. Études d'Entomologie 14: 1–18.

Opinion 2382 (Case 3637) — Conservation of the accustomed usage of *Papilio phoebus* De Prunner, 1798 by suppression of *Papilio phoebus* Fabricius, 1793 not approved (Insecta, Lepidoptera, Papilionidae). The Bulletin of Zoological Nomenclature 73(2-4): 148–149. https://doi.org/10.21805/bzn.v73i2.a21

Paget WH (1874) A record of the expeditions undertaken against the North-west frontier tribes. Compiled from the military and political despatches, Lieut.-Colonel McGregor's gazetteer, and other official sources. Catcutta: Office of Support of Government Printing 454 p.

Paget WH (1907) Frontier and overseas expeditions from India. Vol. IV. North and North-Eastern frontier tribes. Simla: Government Monotype Press 248 p.

Rose K (1995) Zur Unterarten-Inflation in der Gattung *Parnassius* (Lepidoptera, Papilionidae). Nachrichten des entomologischen Vereins Apollo, N.F. 16(2/3): 243–252.

Rose K, Weiss JC (2011) The Parnassiinae of the World. Part 5. Keltern: Goecke and Evers, 120 p.

Sakai S, Inaoka S, Aoki T, Yamaguchi S, Watanabe Y (2002) The parnassiology. The *Parnassius* Butterflies, A Study in Evolution. Tokyo: Kodansha 468 p. [in Japanese].

Schrenk AG (1841) Reise nach dem Balchasch und auf dem Tarbagatai. St. Petersburgischen Zeitung 159: 1–2.

Schrenk AG (1845) Bericht über eine, im Jahre 1840, in die östliche dsungarische Kirgisensteppe unternommene Reise. Beiträge zur Kenntniss des Russischen Reiches 7: 273–341.

Sokolov GN (1929) A structure of the male genitalia in the genus *Parnassius* Latr. Revue Russe d'Entomologie 23(1-2): 60–75 [in Russian].

Sorimachi Y (1995) The Primer of Parnassius. Tokyo: Aporo 180 p. [in Japanese].

Staudinger O (1891) Einige neue Tagfalterarten und Varietäten. Deutsche entomologische Zeitschrift Iris 10: 344–360.

Stichel HFEJ (1906) Beitrag zur Kenntnis der Lepidopteren-Gattung *Parnassius* Latr. Berliner entomologische Zeitschrift 51: 81–94. https://doi.org/10.1002/mmnd.47919060105

Stradomsky BV (2005) Blue butterflies of the subfamily Polyommatinae of the European Russia, Central and Western Caucasus. Rostov-on-Don: Stradomsky Press 148 p.

Todisco V, Gratton P, Cesaroni D, Sbordoni V (2010) Phylogeography of *Parnassius apollo*: hints on taxonomy and conservation of a vulnerable glacial butterfly invader. Biological Journal of the Linnean Society 101: 169–183. https://doi.org/10.1111/j.1095-8312.2010.01476.x

Todisco V, Gratton P, Zakharov EV, Wheat CW, Sbordoni V, Sperling AH (2012) Mitochondrial phylogeography of the Holarctic *Parnassius phoebus* complex supports a recent refugial model for alpine butterflies. Journal of Biogeography 39: 1058–1072. https://doi.org/10.1111/j.1365-2699.2011.02675.x

Toropov SA, Zhdanko AB (2014) The butterflies (Lepidoptera, Papilionoidea) of Eastern Turan, Tarbagatai, Saur and South-eastern Altai. Vol. 1. Papilionidae, Pieridae, Satyridae. Bishkek: Al salam 236 p.

Tshikolovets VV (2005) The butterflies of Kyrgyzstan. Kiyv, Brno: Tshikolovets Publications 511 p.

Tshikolovets VV, Yakovlev RV, Bálint Z. (2009) The butterflies of Mongolia (Lepidoptera, Rhopalocera). Kyiv, Pardubice: Tshikolovets Publications. 320 p.

Wang YL, Pan ZQ, Chen KK, Tao RS, Su CY, Hao JS, Yang Q (2019) Genetic differentiation and phylogeography of the alpine butterfly *Parnassius glacialis* (Papilionidae: Parnassiinae) in China: evidence from mitogenomic AT-rich region. Acta entomologica Sinica 62(4): 475–488 [in Chinese].

Weiss JC (1991) The Parnassiinae of the World. Pt. 1. Venette: Sciences Nat 48 p.
Weiss JC (1992) The Parnassiinae of the World. Pt. 2. Venette: Sciences Nat 88 p.
Weiss JC (1999) The Parnassiinae of the World. Pt. 3. Canterbury: Hillside Books 98 p.
Weiss JC (2005) The Parnassiinae of the World. Pt. 4. Canterbury: Hillside Books 164 p.
Weiss JC, Rose K (2011) The Parnassiinae of the World. Pt. 5. Keltern: Goecke et Evers 119 p.
Weiss JC, Rigout J (2016) The Parnassiinae of the World. Pt. 6. Keltern: Goecke et Evers 116 p.
Yagi T, Katoh T, Chichvarkhin A, Shinkawa T, Omoto K (2001) Molecular phylogeny of butterflies *Parnassius glacialis* and *P. stubbendorfii* at various localities in East Asia.enes Genetic Systematics 76: 229–234. https://doi.org/10.1266/ggs.76.229